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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,785	04/09/2004	Yasushi Okubo	Q81007	8719
23373 7590 01/22/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER ROSASCO, STEPHEN D	
			ART UNIT	PAPER NUMBER
			1756	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/22/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/820,785

Applicant(s)

OKUBO ET AL.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 25-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 8/23/04, 9/9/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

Detailed Action

Applicant's election without traverse of Group I (claims 1-24) in the reply filed on 12/04/06 is acknowledged.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiota et al. (7,115,341) or Chan (6,682,861).

The claimed invention is directed to a photomask blank and a method of producing a photomask in which a light-transmissive substrate is formed thereon with a chromium pattern comprising the steps of: preparing a photomask blank having, on said light-transmissive substrate, at least a chromium film for forming said chromium pattern, an etching mask film made of an inorganic-based material having a resistance against etching of said chromium film, and a resist film;

applying dry etching to said etching mask film using said resist pattern as a mask to form an etching mask pattern; and applying dry etching to said chromium film using said etching mask pattern as a mask to form said chromium pattern, wherein the dry etching of said chromium film is carried out under a condition selected from conditions that cause

damage to said resist pattern to a degree which is unallowable when etching said chromium film using said resist pattern as a mask.

The claimed invention is directed to solving a known problem with a known technique of using an etch protecting layer between the substrate layers and a resist layer.

Claims 11-18 are drawn to a halftone phase shift mask.

Shiota et al. teach the claimed invention (see claims) including a halftone phase shift mask blank for use in comprising a transparent substrate, a light transmitting portion formed on the substrate for transmitting an exposure light beam, a phase shifter portion formed on the substrate for transmitting a part of the exposure light beam as a transmitted light beam and for shifting a phase of the transmitted light beam by a predetermined amount, and a phase shifter film for forming the phase shifter portion.

The phase shifter film comprises a film containing silicon, oxygen, and nitrogen as main components and an etching stopper film formed between the film and transparent substrate.

Chan teaches the claimed invention (see claims and following sections)

Chan's teachings are directed to the same object as applicant's, which is to provide a blank photomask which includes a layer of hard mask material thereby enabling the critical dimensions of a finished photomask to be more uniform. And further to provide a method for manufacturing a finished photomask having improved uniformity of critical dimensions.

Chan teaches a blank photomask comprising a photosensitive resist material layer, a hard mask layer underlying said photosensitive resist material layer, said hard mask layer made from materials which are selectively resistant to etching in said blank

photomask, an opaque layer underlying said hard mask layer, and a substantially transparent substrate layer underlying said opaque layer, said method for creating an image comprising the steps of: creating a patterned image in said photosensitive resist layer; removing portions of said photosensitive resist layer that do not correspond to said patterned image thereby exposing portions of said hard mask layer not corresponding to said patterned image; removing said exposed portions of said hard mask layer that do not correspond to said patterned image thereby exposing portions of said opaque layer not corresponding to said patterned image; and removing said photosensitive resist layer.

And wherein said hard mask layer is comprised of Si and said step of removing said exposed portions of said hard mask layer is conducted using plasma gases, the composition of which has either fluorine, chlorine, or bromine containing species or a combination of various halide containing species.

Alternatively wherein said hard mask layer is selected from the list comprised of Ti, TiW, W, Si.sub.3 N.sub.4, SiO.sub.2, TiN, and spin-on-glass and said step of removing said exposed portions of said hard mask layer is conducted using plasma gases, the composition of which has either fluorine, chlorine, or bromine containing species or a combination of various halide containing species.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nyhus et al. (2004/0101764) in view of Shiota et al. (7,115,341) or Chan (6,682,861).

Claims 19-24 are directed to a method of making a chromeless type phase shift mask.

Nyhus et al. teach a chromeless type phase shift mask and the importance of the CD.

As shown in FIG. 5B, under the same stepper conditions, CPL contact patterning enables contacts with finer critical dimensions (e.g., diameter) to be formed when compared with the conventional binary mask techniques. Thus, existing steppers may be used to form contact patterns having feature sizes and grid densities finer than could be patterned with those steppers under conventional contact patterning techniques.

The teachings of Nyhus et al. differ from those of the applicant in that the applicant teaches the use of an etch protecting layer.

Shiota et al. or Chan are included here as discussed above.

It would have been obvious to one having ordinary skill in the art to take the teachings of Nyhus et al. and combine them with the teachings of Shiota et al. or Chan in order to make the claimed invention because it would have been obvious to one to take

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advantage of the teachings of Shiota et al. or Chan and incorporate the additional inorganic etch protective layer in order to produce a mask with better CD.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Rosasco  
Primary Examiner  
Art Unit 1756

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1/18/07